AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A periodic-pattern suppression method of reducing a spatial frequency component which forms a periodic pattern contained in an original image signal, said method comprising the steps of:

transforming said original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain; and

reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a frequency of said periodic pattern in only the vicinity of an array direction of said periodic pattern, not reducing any of said transformed image signals in a different direction from said vicinity of said array direction of said periodic pattern, and then transforming said transformed image signals into an inverse-transformed signal in said real space domain.

2. (previously presented): A periodic-pattern suppression method of reducing a spatial frequency component resulting from a stationary grid, contained in an original image signal photographed using said stationary grid, said method comprising the steps of:

transforming said original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain; and

reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of said stationary grid, which is actually used, in only the vicinity of a grid array direction of said stationary grid, not reducing any of said transformed image signals in a different direction from said vicinity of said array direction of said periodic pattern, and then transforming said transformed image signals into an inverse-transformed signal in said real space domain.

3. (original): The periodic-pattern suppression method as set forth in claim 2, wherein

said transforming step obtains said plurality of transformed image signals by applying two-dimensional wavelet transformation to said original image signal by the use of a low-pass filter which splits a band so that its response at a frequency greater than the spatial frequency of said stationary grid becomes approximately zero; and

said reducing step further applies a process of reducing a component less than a predetermined frequency and then performs inverse wavelet transformation, with respect to a signal of said transformed image signals which contains a spatial frequency component corresponding to said grid array frequency.

4. (original): The periodic-pattern suppression method as set forth in claim 3, wherein said reducing step reduces a component less than said predetermined frequency, by recursively and repeatedly applying one-dimensional wavelet transformation to the transformed image signal, containing a spatial frequency component corresponding to said grid array frequency, in a grid array direction of said stationary grid by a predetermined number of times by

the use of a predetermined band splitting filter, then making zero transform coefficients of a low frequency image signal of a plurality of image signals obtained by said one-dimensional wavelet transformation, and applying inverse one-dimensional wavelet transformation.

5. (previously presented): The periodic-pattern suppression method as set forth in claim 3, wherein said reducing step calculates powers of said plurality of transformed image signals, judges the grid length direction of said stationary grid, based on whether or not each said calculated power is greater than a predetermined threshold value, and applies said process of reducing a component less than a predetermined frequency, based on the result of judgment.

6. (previously presented): The periodic-pattern suppression method as set forth in claim 4, wherein said reducing step calculates powers of said plurality of transformed image signals, judges the grid length direction of said stationary grid, based on whether or not each said calculated power is greater than a predetermined threshold value, and applies said process of reducing a component less than a predetermined frequency, based on the result of judgment.

7. (currently amended): The periodic-pattern suppression method as set forth in claim 3, wherein said reducing step reduces a signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of each possible stationary grid that may be used in only the vicinity of a grid array direction of said each stationary grid, wherein said reducing step further applies said process of reducing a component less than said predetermined frequency with respect to ~~a~~ the signal of said transformed image signals wherein said reduction comprises reducing a spatial frequency component corresponding to a grid array frequency of each possible stationary grid that may be used and then performs inverse wavelet transformation.

8. (previously presented): The periodic-pattern suppression method as set forth in claim 4, wherein said reducing step reduces a component less than said predetermined frequency, by recursively and repeatedly applying one-dimensional wavelet transformation to the transformed image signal, containing a spatial frequency component corresponding to said grid array frequency, in a grid array direction of each possible stationary grid that may be used by a predetermined band splitting filter, then making zero transform coefficients of a low frequency image signal of a plurality of image signals obtained by said one-dimensional wavelet transformation, and applying inverse one-dimensional wavelet transformation.

9. (original): The periodic-pattern suppression method as set forth in claim 2, wherein

said transforming step obtains said plurality of transformed image signals by applying one-dimensional wavelet transformation to said original image signal in the grid length direction of said stationary grid by the use of a predetermined band splitting filter; and

said reducing step further applies a process of reducing a component less than a predetermined frequency and then performs inverse wavelet transformation, with respect to a low frequency image signal of said transformed image signals which contains a spatial frequency component corresponding to the grid array frequency of said stationary grid.

10. (original): The periodic-pattern suppression method as set forth in claim 9, wherein each stationary grid to be used is subjected to said transforming step and said reducing step.

11. (previously presented): A periodic-pattern suppression unit for reducing a spatial frequency component which forms a periodic pattern contained in an original image signal, said unit comprising the steps of:

image signal transformation means for transforming said original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain; and

periodic-pattern-component suppression means for reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a frequency of said periodic pattern in only the vicinity of an array direction of said periodic pattern, not reducing any of said transformed image signals in a different direction from said vicinity of said array direction of said periodic pattern, and then transforming said transformed image signals into an inverse-transformed signal in said real space domain.

12. (previously presented): A periodic-pattern suppression unit for reducing a spatial frequency component resulting from a stationary grid, contained in an original image signal photographed using said stationary grid, said unit comprising:

image signal transforming means for transforming said original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain; and

stationary grid-component suppressing means for reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of said stationary grid,

which is actually used, in only the vicinity of a grid array direction of said stationary grid, not reducing any of said transformed image signals in a different direction from said vicinity of said array direction of said periodic pattern, and then transforming said transformed image signals into an inverse-transformed signal in said real space domain.

13. (original): The periodic-pattern suppression unit as set forth in claim 12, wherein

said image signal transforming means obtains said plurality of transformed image signals by applying two-dimensional wavelet transformation to said original image signal by the use of a low-pass filter which splits a band so that its response at a frequency greater than the spatial frequency of said stationary grid becomes approximately zero; and

said stationary grid-component suppressing means further applies a process of reducing a component less than a predetermined frequency and then performs inverse wavelet transformation, with respect to an image signal of said transformed image signals which contains a spatial frequency component corresponding to the grid array frequency of said stationary grid.

14. (original): The periodic-pattern suppression unit as set forth in claim 13, wherein said stationary grid-component suppressing means reduces a component less than said predetermined frequency, by recursively and repeatedly applying one-dimensional wavelet transformation to the transformed image signal, containing a spatial frequency component corresponding to said grid array frequency, in a grid array direction of said stationary grid by a predetermined number of times by the use of a predetermined band splitting filter, then making zero transform coefficients of a low frequency image signal of a plurality of image signals obtained by said one-dimensional wavelet transformation, and applying inverse one-dimensional wavelet transformation.

15. (previously presented): The periodic-pattern suppression unit as set forth in claim 13, further comprising stationary grid-direction judging means for calculating powers of said plurality of transformed image signals and judging the grid length direction of said stationary grid, based on whether or not each said calculated power is greater than a predetermined threshold value;

wherein said stationary grid-component suppressing means applies said process of reducing a component less than a predetermined frequency, based on the judgment made by said stationary grid-direction judging means.

16. (original): The periodic-pattern suppression unit as set forth in claim 14, further comprising stationary grid-direction judging means for calculating powers of said plurality of transformed image signals and judging the grid length direction of said stationary grid, based on whether or not each said calculated power is greater than a predetermined threshold value;

wherein said stationary grid-direction judging means applies said process of reducing a component less than a predetermined frequency, based on the judgment made by said stationary grid-direction judging means.

17. (currently amended): The periodic-pattern suppression unit as set forth in claim 13, wherein said stationary grid-component suppressing means applies said process of reducing an image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of each possible stationary grid that may be used in only the vicinity of a grid array direction of said each stationary grid, wherein said reducing step further applies said process of reducing a component less than a predetermined frequency with respect to ~~an~~ the image signal of said

transformed image signals wherein said reduction comprises reducing a spatial frequency component corresponding to the grid array frequency of each possible stationary grid that may be used and then performs inverse wavelet transformation.

18. (previously presented): The periodic-pattern suppression unit as set forth in claim 14, wherein said stationary grid-component suppressing means applies said process of reducing a component less than a predetermined frequency, by recursively and repeatedly applying one-dimensional wavelet transformation to the transformed image signal, containing a spatial frequency component corresponding to said grid array frequency, in a grid array direction of each possible stationary grid that may be used by a predetermined number of times by the use of a predetermined band splitting filter, then making zero transform coefficients of a low frequency image signal of a plurality of image signals obtained by said one-dimensional wavelet transformation, and applying inverse one-dimensional wavelet transformation.

19. (original): The periodic-pattern suppression unit as set forth in claim 12, wherein

said image signal transforming means obtains said plurality of transformed image signals by applying one-dimensional wavelet transformation to said original image signal in the grid length direction of said stationary grid by the use of a predetermined band splitting filter; and

said stationary grid-component suppressing means further applies a process of reducing a component less than a predetermined frequency and then performs inverse wavelet transformation, with respect to a low frequency image signal of said transformed image signals which contains a spatial frequency component corresponding to the grid array frequency of said stationary grid.

20. (original): The periodic-pattern suppression unit as set forth in claim 19, wherein

said image signal transforming means applies said one-dimensional wavelet transformation in the grid length direction of each stationary grid to be used; and

said stationary grid-component suppressing means applies said reducing process and said inverse wavelet transformation to each said stationary grid to be used.

21. (previously presented): A periodic-pattern suppression method of reducing a spatial frequency component resulting from a stationary grid, contained in an original image signal photographed using said stationary grid, said method comprising the steps of:

transforming said original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain; and

reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of said stationary grid having a low range end and a high range end in only the vicinity of a grid array direction of said stationary grid; wherein

frequency components greater than the high end range are not suppressed and lower than the low end range are not suppressed by filtering.

22. (previously presented): The periodic-pattern suppression method as set forth in claim 2, wherein the stationary grid is a vertical grid and the transformed image signals comprise frequency components of a two-dimensional wavelet transformation, said transformed image signals being subjected to a one dimensional transformation in the vertical scanning direction.

23. (previously presented): The periodic-pattern suppression method as set forth in claim 2, wherein the stationary grid is a horizontal grid and the transformed image signals comprise frequency components of a two-dimensional wavelet transform, said transformed

image signals being subjected to one dimensional wavelet transformation in the horizontal scanning direction.

24. (previously presented): The apparatus of for periodic-pattern suppression reducing a spatial frequency component resulting from a stationary grid which is contained in an original image signal photographed using said stationary grid, said apparatus comprising:

means for transforming said original image signal, represented in a real space domain, into a plurality of transformed image signals which can be handled in a frequency domain; and

means for reducing a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of said stationary grid having a low range end and a high range end in only the vicinity of a grid array direction of said stationary grid; wherein

frequency components greater than the high end range are not suppressed and lower than the low end range are not suppressed by filtering.

25. (previously presented): The apparatus of Claim 24 wherein, wherein the stationary grid is a vertical grid and the transformed image signals comprise frequency components of a two-dimensional wavelet transformation, said transformed image signals being subjected to a one dimensional transformation in the vertical scanning direction.

26. (previously presented): The apparatus of Claim 24 wherein, wherein the stationary grid is a horizontal grid and the transformed image signals comprise frequency components of a two-dimensional wavelet transform, said transformed image signals being subjected to one dimensional wavelet transformation in the horizontal scanning direction.

27. (previously presented): The periodic-pattern suppression method as set forth in claim 2, wherein said reducing step reduces said transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of each possible stationary grid that may be used in only the vicinity of a grid array direction of said each stationary grid.

28. (previously presented): The periodic-pattern suppression unit as set forth in claim 12, wherein said stationary grid-component suppressing means reduces a transformed image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of each possible stationary grid that may be used in only the vicinity of a grid array direction of said stationary grid.

29. (previously presented): The periodic-pattern suppression method as set forth in claim 2, wherein said reducing step judges the grid array direction of said stationary grid, and applies said process of reducing a component less than a predetermined frequency, based on the result of judgment.

30. (previously presented): The periodic-pattern suppression unit as set forth in claim 12, further comprising stationary grid-direction judging means for judging the grid array direction of said stationary grid,

wherein said stationary grid-component suppressing means applies said process of reducing a component less than a predetermined frequency, based on the judgment made by said stationary grid-direction judging means.

31. (previously presented): The periodic-pattern suppression method according to claim 1, wherein said original image signal comprises a complete original photographed image.

32. (previously presented): The periodic-pattern suppression method as set forth in claim 2, wherein said reducing step reduces a component less than a predetermined frequency, by recursively and repeatedly applying one-dimensional wavelet transformation to the transformed image signal, containing a spatial frequency component corresponding to said grid array frequency, in a grid array direction of said stationary grid by a predetermined number of times by the use of a predetermined band splitting filter, then making zero transform coefficients of a low frequency image signal of a plurality of image signals obtained by said one-dimensional wavelet transformation, and applying inverse one-dimensional wavelet transformation.

33. (previously presented): The periodic-pattern suppression method as set forth in claim 2, wherein said reducing step calculates powers of said plurality of transformed image signals, judges a grid length direction of said stationary grid, based on whether or not each said calculated power is greater than a predetermined threshold value, and applies a process of reducing a component less than a predetermined frequency, based on the result of judgment.

34. (previously presented): The periodic-pattern suppression unit as set forth in claim 12, wherein said stationary grid-component suppressing means reduces a component less than a predetermined frequency, by recursively and repeatedly applying one-dimensional wavelet transformation to the transformed image signal, containing a spatial frequency component corresponding to said grid array frequency, in a grid array direction of said stationary grid by a predetermined number of times by the use of a predetermined band splitting filter, then making zero transform coefficients of a low frequency image signal of a plurality of image signals obtained by said one-dimensional wavelet transformation, and applying inverse one-dimensional wavelet transformation.

35. (previously presented): The periodic-pattern suppression unit as set forth in claim 12, further comprising stationary grid-direction judging means for calculating powers of said plurality of transformed image signals and judging a grid length direction of said stationary grid, based on whether or not each said calculated power is greater than a predetermined threshold value;

wherein said stationary grid-component suppressing means applies a process of reducing a component less than a predetermined frequency, based on the judgment made by said stationary grid-direction judging means.

36. (previously presented): The periodic-pattern suppression method as set forth in claim 1,

wherein said reducing a transformed image signal comprises reducing the transformed image signal by extracting a low frequency component in a direction perpendicular to said array direction from said transformed image signal containing at least said spatial frequency component corresponding to said frequency of said periodic pattern in said array direction, said low frequency component having a spatial frequency lower than a predetermined value, and then reducing said extracted low frequency component.

37. (previously presented): A periodic-pattern suppression unit as set forth in claim 11,

wherein said periodic-pattern-component suppression means reduces the transformed image signal by extracting a low frequency component in a direction perpendicular to said array direction from said transformed image signal containing at least said spatial frequency component corresponding to said frequency of said periodic pattern in said array direction, said

low frequency component having a spatial frequency lower than a predetermined value, and then reducing said extracted low frequency component.

38. (currently amended): The periodic-pattern suppression method as set forth in claim 3, wherein said reducing step reduces a signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of each possible stationary grid that may be used in only the vicinity of a grid array direction of said each stationary grid, wherein said reducing step further applies said process of reducing a component less than said predetermined frequency with respect to ~~a~~ the signal of said transformed image signals wherein said reduction comprises reducing a spatial frequency component corresponding to a grid array frequency of each possible stationary grid to be used and performs inverse wavelet transformation.

39. (currently amended): The periodic-pattern suppression unit as set forth in claim 13, wherein said stationary grid-component suppressing means applies said process of reducing an image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of each possible stationary grid that may be used in only the vicinity of a grid array direction of said each stationary grid, wherein said reducing step further applies said process of reducing a component less than a predetermined frequency with respect to ~~an~~ the image signal of said transformed image signals wherein said reduction comprises reducing a spatial frequency component corresponding to the grid array frequency of each possible stationary grid to be used and performs inverse wavelet transformation.

40. (new): The periodic-pattern suppression method as set forth in claim 7, wherein said reducing step reduces said signal of said image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a horizontal stationary grid in only the vicinity of a grid array direction of said stationary grid, and further reduces said signal of said transformed image signal which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a vertical stationary grid in only the vicinity of a grid array direction of said stationary grid.

41. (new): The periodic-pattern suppression method as set forth in claim 17, wherein said reducing step reduces said image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a horizontal stationary grid in only the vicinity of a grid array direction of said stationary grid, and further reduces said image signal of said transformed image signals which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a vertical stationary grid in only the vicinity of a grid array direction of said stationary grid.

42. (new): The periodic-pattern suppression method as set forth in claim 38, wherein said reducing step reduces said signal of said transformed image signal which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a horizontal stationary grid in only the vicinity of a grid array direction of said stationary grid, and further reduces said signal of said transformed image signal which has a desired frequency range containing a spatial frequency component corresponding to at least a

grid array frequency of a vertical stationary grid in only the vicinity of a grid array direction of said stationary grid.

43. (new): The periodic-pattern suppression method as set forth in claim 39, wherein said reducing step reduces said image signal of said transformed image signal which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a horizontal stationary grid in only the vicinity of a grid array direction of said stationary grid, and further reduces said image signal of said transformed image signal which has a desired frequency range containing a spatial frequency component corresponding to at least a grid array frequency of a vertical stationary grid in only the vicinity of a grid array direction of said stationary grid.